Linking a Simulation Model to a Schematic Component

Summary

This application note provides information on getting a simulation model – obtained outside of Altium Designer – into a format supported by the software, and then linking that model to a schematic component. Linking from an external database is also covered.

Application Note
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Altium Designer provides a powerful mixed-signal circuit simulator, enabling you to thoroughly analyze a circuit – not only observing its behavior, but also ensuring that it operates within specific design constraints. To simulate a design successfully, all components in the circuit must be simulation-ready, that is, they must each have a linked simulation model defined for them.

Altium Designer comes with a host of components stored within manufacturer-specific integrated libraries. Many of these components have linked simulation models, making creation of a simulation-ready circuit quick and efficient – a case of Place 'n Simulate if you will.

With such a vast pool of components available to designers in the real world, there will often be times where the component(s) required for use in a circuit will need to be created in libraries added by the user. As well as defining the component's symbol, a simulation model for that component needs to be acquired and then linked, in order to make that component simulation-ready.

Acquiring the Model

A simulation model can be obtained from many and varied sources. The following is a non-exhaustive list of possible places or methods to get the model you require for a target device you wish to use in your design:

- **Manufacturer** – a popular place to look for a model is on the website for the manufacturer that makes the device you want to use. Typically, there will be a link to any available model from the page dealing with the specific device. Models are commonly supplied in SPICE or PSpice® format.
- **Altium Designer's SPICE Model Wizard** – use this wizard to create and automatically link a SPICE3f5 device model to an existing or new library component. If linking to a new component, that component will be created automatically by the wizard. The following device model types are supported: Semiconductor Capacitor, Semiconductor Resistor, Current-Controlled Switch, Voltage-Controlled Switch, JFET, Lossy Transmission Line, Uniform Distributed RC Transmission Line, Diode and BJT.
- **Third-Party Modeling Tools** – various simulation software packages contain features for modeling a device. This typically takes the form of a model wizard.
- **Dedicated Modeling Companies** – you may be able to source the required model from a third-party company which creates simulation models based on a given specification.
- **By Hand** – the required model can be created yourself, from scratch. This will typically require good knowledge of the language in which the model definition is being written, for example when creating a subcircuit, or a digital device definition using Digital SimCode™. When creating a simple MDL file for a built-in SPICE3f5 or supported PSpice model, you will need good knowledge of the parameters available for, and supported by, that device.

For more information on using Altium Designer's Spice Model Wizard to create a simulation model, refer to the application note *SPICE Model Creation from User Data*.

For more information on the various predefined models available with Altium Designer, including information on the built-in analog SPICE3f5 and supported PSpice models, refer to the *Simulation Models and Analyses Reference*.

For more information on working with digital device models, refer to the application note *Creating and Linking a Digital SimCode Model*.

Readying the Model for the Altium Designer Arena

Once you have the required simulation model, you need to ensure that it is in a form compatible with Altium Designer. To begin with, it must be in one of the supported model formats:

- **SPICE3f5**
- **XSpice**
- **PSpice**

For a simple model, the definition must be saved with an `mdl` extension (e.g. `MyBJT.mdl`). For a more complex SPICE subcircuit, the definition must be saved with a `ckt` extension (e.g. `MyOpAmp.ckt`).

With Altium Designer's support for PSpice models, very little will need to be done to the majority of models acquired in PSpice format, other than to paste the required model into a file with the MDL extension.

Model Conversion

There are many variants of SPICE out in the design world today – SPICE3f5, PSpice®, HSPICE®, NSPICE® and Eldo® to name but a few. Discussion of these various formats and the models they support is beyond the scope of this document.

Some commercial versions (or variants) of SPICE have proprietary extensions that limit the portability of model descriptions between different vendor SPICE formats.

The majority of manufacturers will provide pure SPICE (SPICE3f5) or PSpice formats. If your model is in a format other than those supported by Altium Designer, or it is a PSpice model type that is currently not supported, you will need to convert it into the required format. This is a manual process, requiring the user manuals for both source (e.g. PSpice) and target (e.g. SPICE3f5) SPICE formats and, preferably, a detailed knowledge of the two. Compare the syntaxes of the two formats and convert to something compatible.

If a PSpice model type is supported but a particular parameter is not, that parameter, in many cases, can be ignored with only minor impact on the simulation results. However, the true impact on the results will depend on which parameter it is and the nature of the circuit/simulation.

Linking the Model to a Schematic Component

Once you have the required simulation model file, you will need to link it to the schematic component that you wish to place and use in your design.

To illustrate by example the steps that need to be taken to link a model to a schematic component, we shall use a simple (and fictitious) diode model – `JAS33` – obtained from a manufacturer and pasted into the file `JAS33.mdl`.

Creating the Schematic Component

The first step (typically) when creating a new simulation-ready device is to create a schematic library component for that device and define the symbol graphics. This is done using Altium Designer's Schematic Library Editor.

Often, you'll find it easier to copy an existing component and then modify it as required, rather than create the component and related graphics from scratch.

Figure 1 shows the symbol graphics for our simple diode component `DIODE JAS33`.

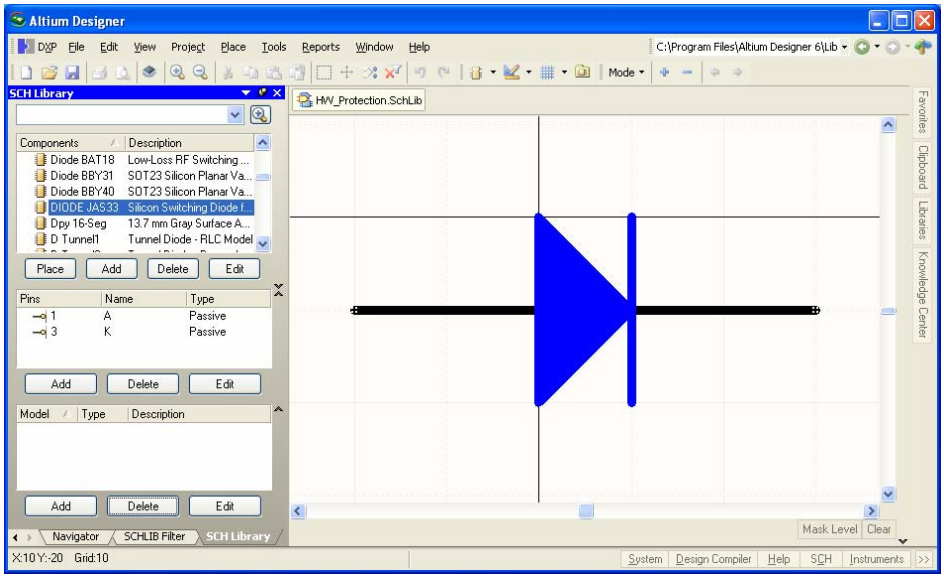


Figure 1. Defining the component in the Schematic Library Editor.

For details on creating components in Altium Designer, refer to the *Creating Library Components* tutorial.

Adding the Link

Whether you have created a new schematic component, or are using an existing one, it is now time to create a link to the simulation model file. The first step in this process is to add a simulation model link to the component, carried out in the Schematic Library Editor in one of the following ways:

- In the Models region of the Editor's main design window, click on the drop-down arrow associated with the lower-left button and choose **Simulation** from the list of available model types.

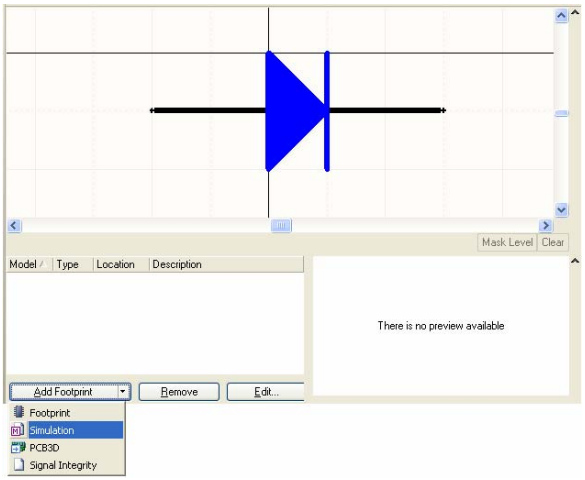


Figure 2. Adding models from the main editing window.

- In the Models region of the **SCH Library** panel, click on the associated **Add** button and choose **Simulation** as the model type in the *Add New Model* dialog that appears.

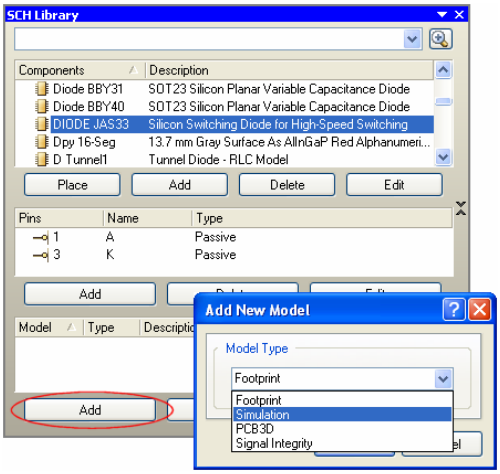


Figure 3. Adding models from the SCH Library panel.

- Use the *Model Manager* dialog (**Tools » Model Manager**). Simply select the entry for the component, click on the drop-down arrow associated with the **Add** button, and choose **Simulation** from the list of available model types.

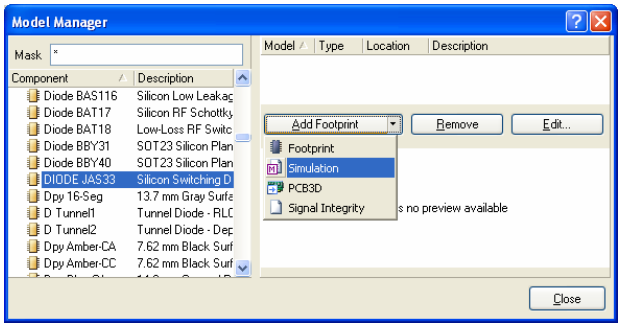


Figure 4. Adding models using the Model Manager.

Configuring the Link

Whichever method you use to add a simulation model link to a component, you will be taken to the *Sim Model* dialog (Figure 5) – command central for configuring the link to the required simulation model.

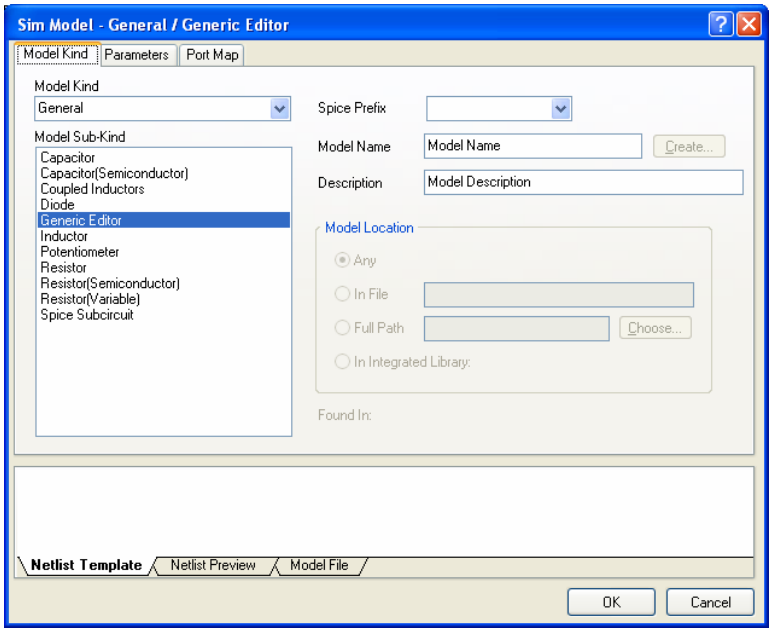


Figure 5. Configuring the model link in the Sim Model dialog.

Specifying Model Type

The **Model Kind** and **Model Sub-Kind** fields need to be set according to the particular model type you are linking. The **Model Kind** drop-down gives access to a number of model categories containing the range of analog device models built-in to SPICE. The **Model Sub-Kind** region lists all model types in a chosen category.

Linking to a SPICE3f5 Model

Many of the built-in SPICE models require no model file. Definition is made by setting the required values for model parameters at the component-level. The following is a list of the device models that support the use of an associated model file, which can contain a variety of parameters used to model advanced characteristics of the device. (Entries in the list are in the format **Model Kind\Model Sub-Kind**).

- Current Source\Piecewise Linear
- General\Capacitor(Semiconductor)
- General\Diode
- General\Resistor(Semiconductor)
- Switch\Current-Controlled
- Switch\Voltage-Controlled
- Transistor\BJT
- Transistor\JFET
- Transistor\MESFET
- Transistor\MOSFET
- Transmission Line\Lossy
- Transmission Line\Uniform Distributed RC
- Voltage Source\Piecewise Linear.

If you are linking a SPICE 3f5 model for any of these inherent SPICE devices, simply select the Model Kind and Sub-Kind, as per the above list. The required **Spice Prefix** field will be set automatically.

Considering our JAS33 example diode model, the entries in the dialog at this point would be:

Model Kind: `General`

Model Sub-Kind: `Diode`

Spice Prefix: `D`.

The Netlist Template

The netlist template allows access to the information that is entered into the XSpice netlist for a given component. It is accessed by clicking on the **Netlist Template** tab at the bottom of the *Sim Model* dialog.

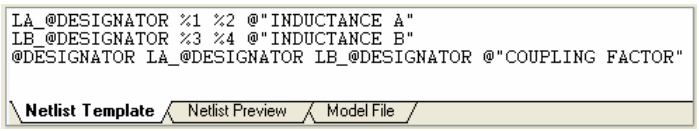


Figure 6. Example netlist template entry for a coupled inductor model.

It is read-only for the predefined SPICE3f5 model types. If, however, one of these predefined entries does not allow enough control over the information placed in the netlist, you can define your own template.

To define your own netlist template, and indeed this is a requirement of certain model types (discussed elsewhere in this document), simply set the **Model Kind** to `General` and the **Model Sub-Kind** to `Generic Editor`.

For more information on using the Netlist Template, including syntax rules, refer to the section *The Netlist Template – Explained*, which can be found in the *Simulation Models and Analyses Reference*.

Linking to an XSpice Code Model

When linking an XSpice code model to the component, use of a model file is not applicable. The model itself is defined using the **Netlist Template** tab of the *Sim Model* dialog, with the parameters specified in the template declared and defined on the **Parameters** tab of the dialog.

Ensure that the **Model Kind** is set to `General` and that the **Model Sub-Kind** is set to `Generic Editor`. The **Spice Prefix** for this type of model must be set to `A`.

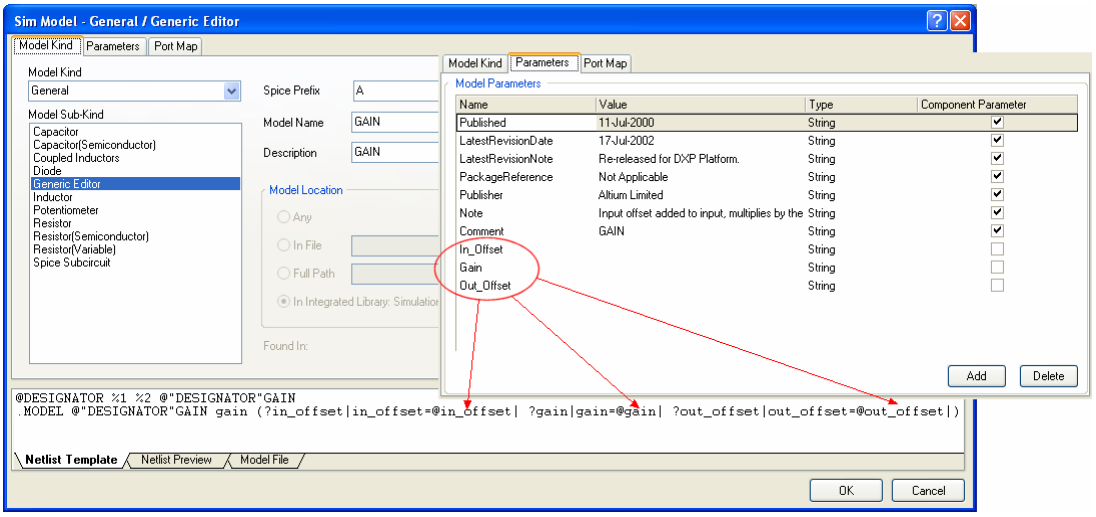


Figure 7. Parameter declarations for an XSpice model.

Linking to a Subcircuit Model

If the model you wish to link has been described using the hierarchical sub-circuit syntax (for an operational amplifier or crystal oscillator for example), the model definition will have been saved to file with a `ckt` extension.

Ensure that the **Model Kind** field is set to `General` and that the **Model Sub-Kind** is set to `Spice Subcircuit`. The required **Spice Prefix** field will be set automatically to `X`. Figure 8 shows an example simulation link to a crystal subcircuit.

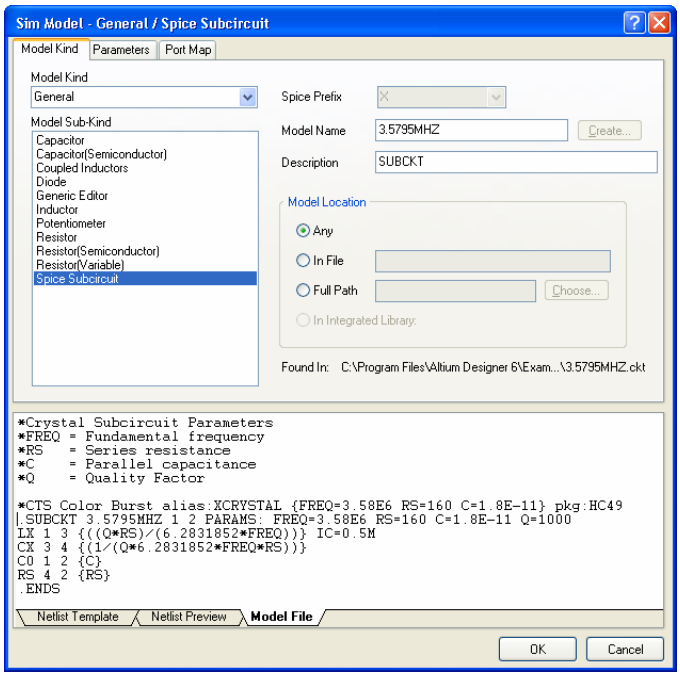


Figure 8. Example of a linked SPICE subcircuit model.

For greater control over the netlist template, you can set the **Model Sub-Kind** to `Generic Editor`.

For more information on this type of model, refer to the *Sub-circuit based models* section of the *Simulation Models and Analyses Reference*.

Linking to a PSpice Model

Altium Designer offers strong support for PSpice models. The following is a list of the PSpice device models supported:

- Capacitor
- Resistor
- Diode
- Inductor
- Current-Controlled Switch
- Voltage-Controlled Switch
- Voltage-Controlled Voltage Source
- Voltage-Controlled Current Source
- Current-Controlled Voltage Source
- Current-Controlled Current Source
- Bipolar Junction Transistor (BJT)
- Junction Field Effect Transistor (JFET)
- Metal Oxide Semiconductor Field Effect Transistor (MOSFET)

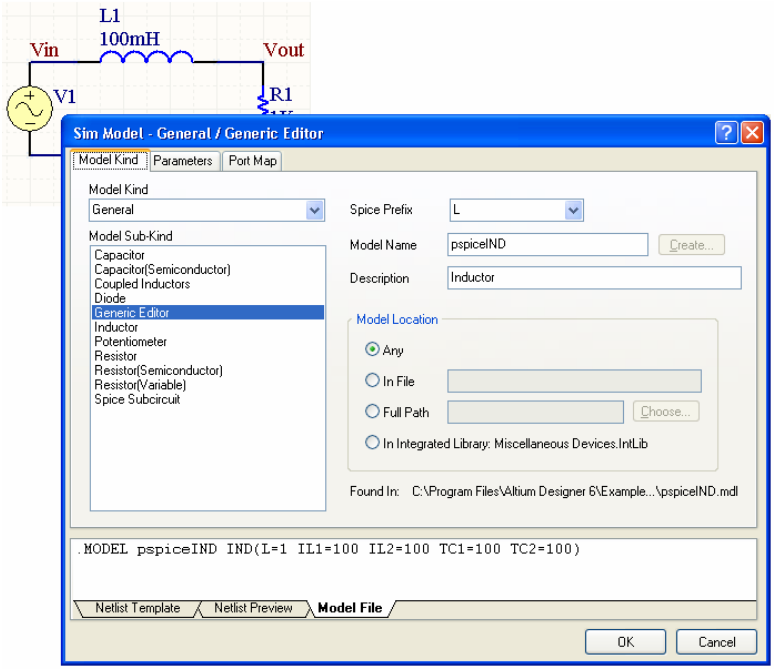


Figure 9. Example of a linked PSpice Inductor model.

With the exception of Resistor, Inductor and the voltage and current sources, simply select the Model Kind and Sub-Kind, as per the list for SPICE3f5 models (see *Linking to a SPICE3f5 Model*). The required **Spice Prefix** field will be set automatically. For the exceptions, you will need to set the **Model Kind** to `General`, the **Model Sub-Kind** to `Generic Editor` and enter the applicable netlist template format. You will also need to set the **Spice Prefix** accordingly.

For more information on the level of support for PSpice models in Altium Designer, including netlist template entries and supported parameters, refer to the *Support for PSpice Models in Altium Designer* application note.

Linking to a Digital SimCode Model

Digital device models are created using the Digital SimCode language. This is a special descriptive language that allows digital devices to be simulated using an extended version of the event-driven XSpice.

For a digital device, the schematic component is linked to the SimCode model by using an intermediate model file (`*.mdl`) – effectively calling the SimCode description from within its `.MODEL` line.

In the *Sim Model* dialog, ensure that the **Model Kind** is set to `General`, the **Model Sub-Kind** is set to `Generic Editor` and the **Spice Prefix** is set to A. You will need to enter the netlist template specific to the digital device being modeled, on the **Netlist Template** tab of the dialog.

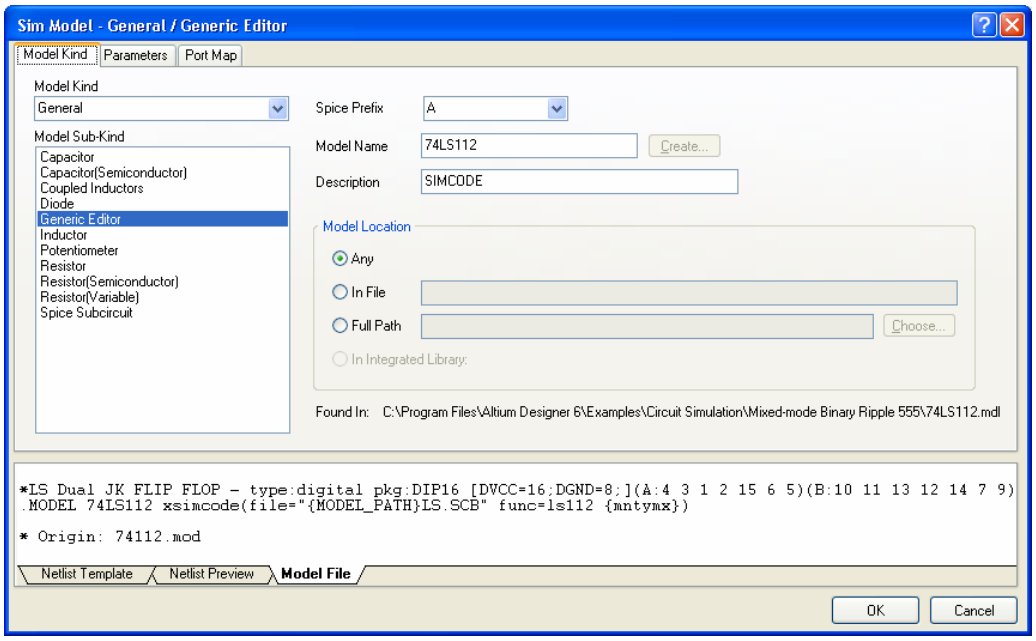


Figure 10. Example of a linked Digital SimCode model.

For more information on working with digital device models, refer to the *Creating and Linking a Digital SimCode Model* application note.

Specifying Model Name

Use the **Model Name** field in the *Sim Model* dialog to specify the name of the model to which you are linking. This must be the name, as it appears in the model file.

For an MDL file, the name must be that appearing in the `.MODEL` line of the model's definition. Consider a model for a diode with the following definition:

```
.MODEL 1N4002 D(IS=2.55E-9 RS=0.042 N=1.75 TT=5.76E-6 CJO=1.85E-11
+ VJ=0.75 M=0.333 BV=100 IBV=1E-5 )
```

The model name here is `1N4002`. This is the name that must be entered into the **Model Name** field.

For a CKT file, the name must be that appearing in the `.SUBCKT` line of the model's definition. Consider a model for a fuse with the following definition:

```
.SUBCKT FUSE 1 2 PARAMS: CURRENT=1 RESISTANCE=1m
SW1 1 2 3 0 SMOD OFF
BNLV 3 0 V=(abs(v(1,2)))
.MODEL SMOD SW (VT={(CURRENT*RESISTANCE)} RON=1g ROFF={RESISTANCE})
.ENDS FUSE
```

The model name here is `FUSE`. This is the name that must be entered into the **Model Name** field.

Use the optional **Description** field to enter a brief description of the model – for example its purpose – should you wish.

Specifying Model Location

Use the Model Location region of the *Sim Model* dialog to control where the model is searched for:

- **Any** – searches all valid model locations for a matching model.

- **In File** – only searches for a matching model in the specified file (`*.mdl`, `*.ckt`), along all valid model locations.
- **Full Path** – only searches for a matching model in the specified file (`*.mdl`, `*.ckt`) along the specified path.
- **In Integrated Library** – draws the model directly from the integrated library used to place the component instance. The integrated library must be available in a valid location.

Valid model locations consist of:

- **Project Models** – `.mdl` or `.ckt` files added to the project
- **Installed Models** – `.mdl` or `.ckt` files added to the Installed Libraries list
- **Project Search Paths** – `.mdl` or `.ckt` files made available to a project by defining one or more search paths in the *Options for Project* dialog.

For more information about linked models, including referencing and searching, refer to the *Component, Model and Library Concepts* article.

When the search is across all valid model locations, the order of the search is Project Models – Installed Models – Project Search Paths. The search ceases as soon as a match is found – i.e. the **Model Name** entry in the `.MODEL` line of a `.mdl` file (or the `.SUBCKT` line of a `.ckt` file) matches the **Model Name** entry in the *Sim Model* dialog for that component. Typically the model file is named the same as the model itself, e.g. the `.MODEL` line contains `74LS74` and the `.mdl` file has been saved with the name `74LS74.mdl`.

This is not a constraint however. For example, the `.MODEL` line could contain the model name `74LS74` and then the `.mdl` file saved with the name `DFlipFlop.mdl`. This file would be yielded as a match, provided that the **Model Name** entry in the *Sim Model* dialog is `74LS74`.

Once successfully linked, an entry for where the corresponding model file (`*.mdl`, `*.ckt`) has been found will be displayed. Figure 11 shows the **Model Kind** tab of the *Sim Model* dialog with the Model Location information for our JAS33 example.

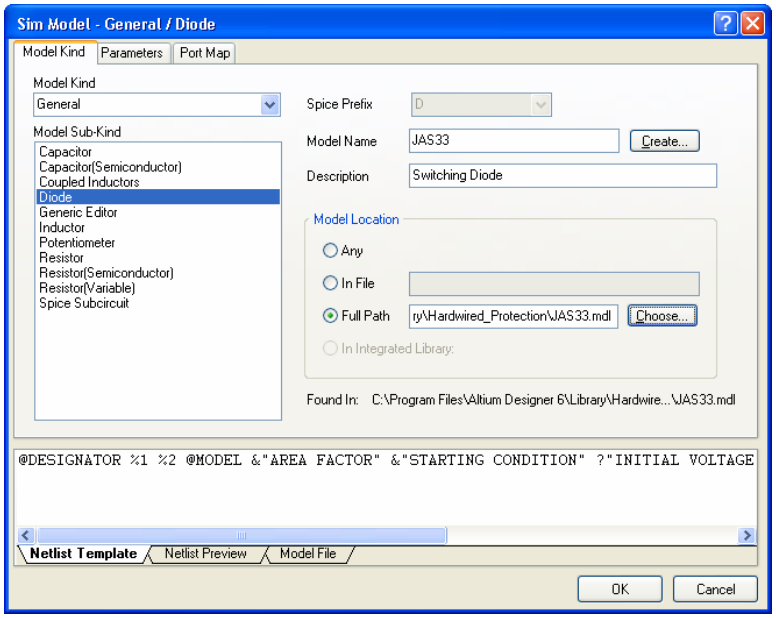
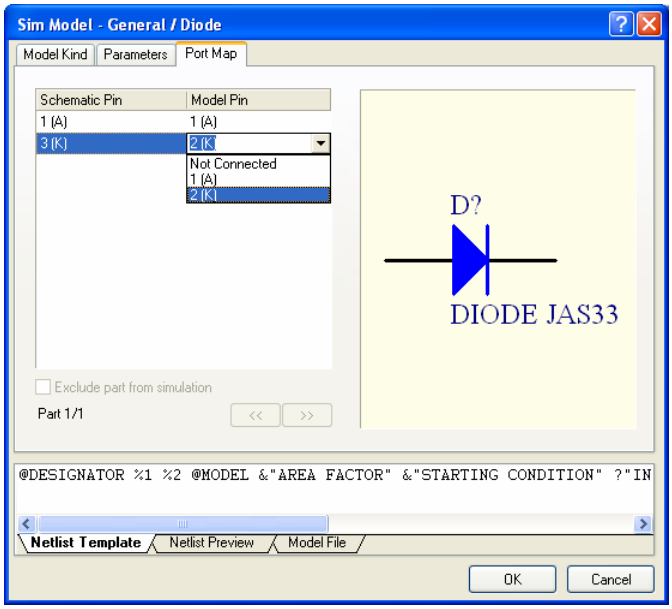


Figure 11. Model location information for the JAS33 diode example.

Notice in Figure 11 that the model has been located by using the **Full Path** option.

Mapping the Ports

Once the simulation model file has been linked to the schematic component, you need to ensure that the pins of the schematic component are correctly mapped to the pins of the model. This is carried out on the **Port Map** tab of the *Sim Model* dialog.



For the built-in SPICE3f5 and supported PSpice models, the function of each of the pins in a model can be found in the general form section for that model, in the SPICE 3f5 user manual.

For subcircuit models, the manufacturer will typically insert comments for each pin of the model, describing that pin's function. If no commenting is evident, then the pinout of the model will typically be that of the physical device itself. Consult the datasheet for the device in this case.

For Digital SimCode models, the mapping of the component pins to the INPUTS and OUTPUTS declared in the SimCode file will depend on the input and output node list entries in the netlist template. For more detailed information, refer to the *Creating and Linking a Digital SimCode Model* application note.

Figure 12. Ensuring correct component pin-to-model port mapping.

For each schematic pin, simply use the available drop-down to change the associated **Model Pin** entry accordingly. If the device is multi-part, be sure to check the mapping for each part.

Defining Component-Level Parameters

For many model types it is possible to set one or more parameters at the component level. This is carried out on the **Parameters** tab of the *Sim Model* dialog.

For some of the built-in SPICE3f5 models, entering a value for a parameter at the component level will override a related parameter defined in a linked model file (`*.mdl`). For a semiconductor capacitor, for example, specifying a value for the component-level `Width` parameter will override any value specified for the `DEFW` parameter in the associated model file.

For the built-in SPICE3f5, supported PSpice and subcircuit model kinds, the available parameters will automatically be listed. When linking models using the Generic Editor you will need to add applicable parameters manually.

If a parameter is specified at the component level for a subcircuit model, that value will override the value defined for it in the linked subciruit file (`*.ckt`).

If a parameter is specified at the component level for a digital device, that value will override the value specified for that parameter in the source SimCode definition.

Figure 13 shows the parameters available for our JAS33 diode device model. If you require any parameter values to be displayed on the schematic sheet, simply enable the corresponding **Component Parameter** option.

Many component-level parameters will have a default value assigned to them which, although not displayed, will be used if no specific value is set.

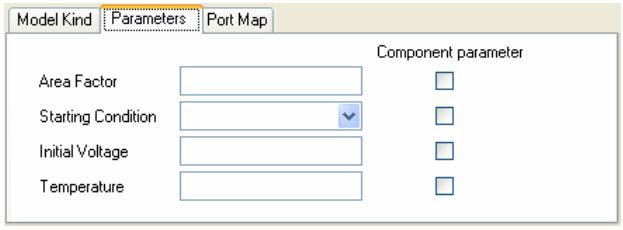


Figure 13. Component-level parameters for the JAS33 diode example.

For more information regarding parameters set at the component level for each of the built-in analog SPICE3f5 models, predefined XSpice and subcircuit models and TTL and CMOS digital device models, refer to the relevant sections of the *Simulation Models and Analyses Reference*.

Linking from an External Database

Altium Designer provides the ability to place components directly from a company database by creating and using a Database Library (`*.DBLib`). Placement is carried out from the **Libraries** panel which, after installing the database library, acts as a browser into your database (Figure 14).

With this method of linking the component symbol, model and parameter information for a component is stored as part of the record definition for that component in the external database. The referenced schematic component (in an underlying component library (`*.SchLib`)) is simply an empty shell, with a defined symbol only. There are no linked models and no defined design parameters. When the component is placed, its parameter and model information is created on-the-fly, using the corresponding fields in the matched database record and in accordance with defined mapping.

As part of the Database Library feature, you can add simulation model information to a component record in the external database. When the component is placed on the schematic, this information will be used to create the link to the referenced simulation model – filling-in the required (and corresponding) areas of the *Sim Model* dialog.

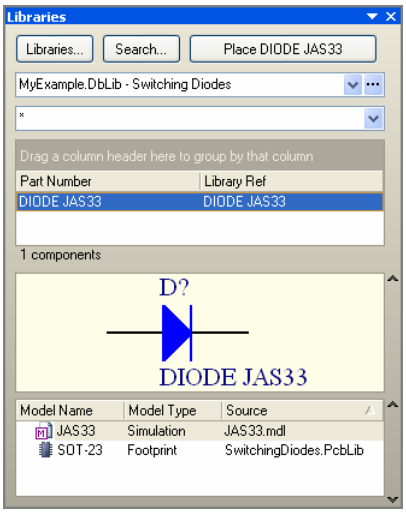


Figure 14. Component placement (with sim link) direct from a database library.

For detailed information on using the Database Library feature, refer to the *Using Components Directly from Your Company Database* application note. This document should ideally be read prior to, or at least in conjunction with, the remainder of this document.

Adding Sim Information to an External Database Table

The following sections discuss each of the database fields that can be added to an external database table in order to define the simulation model link, which will be created upon component placement. If the field names are named exactly as indicated, the Database Field-to-Design Parameter mapping will be automatically set on the **Field Mappings** tab of the DBLib file. You can, of course, use your own field names in the database table, but you will then need to manually map these fields to the correct design parameters.

Simulation information must be entered manually into the external database. Using the *Integrated Library to Database Library Translator Wizard* will not extract the required simulation information and store it into the target database.

We shall use our trusty `JAS33` diode model to illustrate the linking.

Only one simulation model link can be defined in an external database. Typically there will only ever be a single model linked to the component. Should you wish to set up multiple simulation model links, the other links will need to be defined and stored with the component in the source schematic library file.

Sim Model Name

Create this field in the database to specify the name of the model that you wish to use. After the component is placed, this information will appear in the **Model Name** field, on the **Model Kind** tab of the *Sim Model* dialog.

In the database record for our example diode, we would enter `JAS33` into this field.

When mapping database fields to design parameters in the DBLib file, the **Sim Model Name** field is analogous to the **Footprint Ref**, **Library Ref**, etc, fields.

Sim Description

Create this field in the database if you wish to provide a description for the linked model. This information is optional and does not affect the operation of the simulation model link. After the component is placed, this information will appear in the **Description** field, on the **Model Kind** tab of the *Sim Model* dialog.

In the database record for our example diode, we could enter `DIODE`.

Sim File

Create this field in the database if you wish to specify a particular model file in which to find the simulation model specified in the **Sim Model Name** field. There are a number of ways in which this field can be used:

- You can enter an absolute path to a model file (e.g. `C:\DBLibs\Switching Diodes\Libraries\JAS33.mdl`). The model specified in the **Sim Model Name** field will be searched for within this file and used if found.
- You can enter a relative path (relative to the DBLib file) to a model file (e.g.

When mapping database fields to design parameters in the DBLib file, the **Sim File** field is analogous to the **Footprint Path**, **Library Path**, etc, fields.

Search paths are defined for the DBLib file from the **Symbol & Model Search Paths** tab of the *Database Library Options* dialog (**Tools » Options**).

`Libraries\JAS33.mdl`). The model specified in the **Sim Model Name** field will be searched for within this file and used if found.

- You can enter the model filename only (e.g. `JAS33.mdl`). Search paths defined as part of the DBLib file will be used to locate the first model file that matches the specified name, and which contains a match for the model specified in the **Sim Model Name** field.
- You can leave the field blank. Search paths defined as part of the DBLib file will be used to locate the first model file containing a match for the model specified in the **Sim Model Name** field.

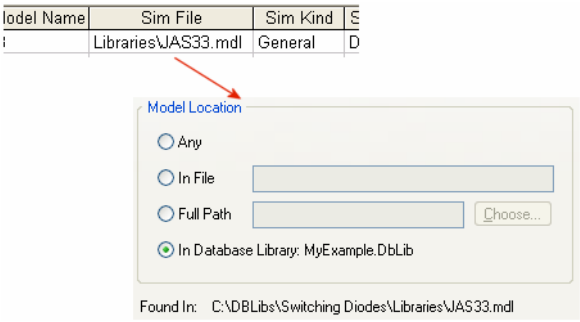


Figure 15. Providing model location information.

Sim Kind

Create this field in the database to specify the parent category for the model being linked to. This information corresponds to the **Model Kind** field, on the **Model Kind** tab of the *Sim Model* dialog. The text entered must be as it appears in the **Model Kind** field.

For our example diode, we would enter `General`.

Sim SubKind

Create this field in the database to specify the type of model being linked to. This information corresponds to the **Model Sub-Kind** field, on the **Model Kind** tab of the *Sim Model* dialog. The text entered must be as it appears in the **Model Sub-Kind** field.

For our example diode, we would enter `Diode`.

Sim Netlist

Create this field in the database if you are specifying your own netlist template and have set the **Sim SubKind** field to `Generic Editor`. Simply enter the netlist template information. After the component is placed, this information will appear on the **Netlist Template** tab of the *Sim Model* dialog.

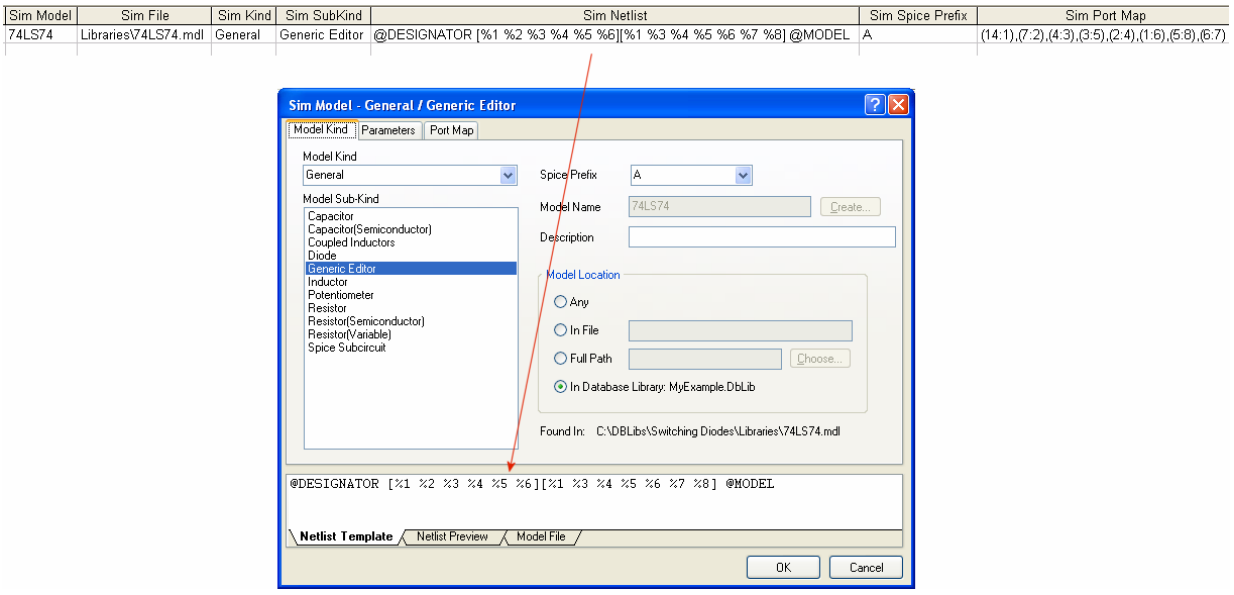


Figure 16. Example netlist specification for a linked digital device model (74LS74).

Sim Spice Prefix

Create this field in the database to specify the SPICE prefix for the model type you are linking to. This information corresponds to the **Spice Prefix** field, on the **Model Kind** tab of the *Sim Model* dialog.

For our example diode, we would enter `D`.

For information on the Spice prefix required for a particular model type, refer to the relevant section for that model type in the *Simulation Models and Analyses Reference*.

Sim Port Map

Create this field in the database to specify the mapping of pins from the schematic component to the pins of the linked model. After the component is placed, this information will appear on the **Port Map** tab of the *Sim Model* dialog.

Each pin pairing must be entered in the following format:

`(SchematicPinNumber:ModelPinNumber)`,

with each mapped pairing separated by a comma.

For our diode example, schematic pin 1(anode) must be mapped to model pin 1(anode), and schematic pin 3 (cathode) must be mapped to model pin 2 (cathode). This would be entered into the database field as:

`(1:1),(3:2)`

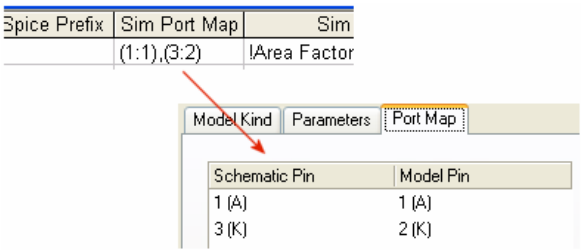


Figure 17. Specifying component-to-model pin mapping.

Sim Excluded Parts

Create this field in the database if you wish to exclude certain parts of a multi-part component from being simulated. This information corresponds to the **Exclude part from simulation** option on the **Port Map** tab of the *Sim Model* dialog.

By default, all parts of a multi-part component are included in a simulation, so you only need to specify the parts you wish to exclude, by number. Separate multiple parts in the exclusion list using commas. For example if a component has four parts and you do not want parts 2 and 4 to be included in any simulation, then you would enter the following into the database field:

`2,4`

Sim Parameters

Create this field in the database if you wish to assign values to simulation parameters for the model. These are parameters that can be defined at the component-level, as opposed to the more advanced parameters that can be included in a model file.

A parameter must be entered in the following format:

`ParameterName=Value`,

To check on supported component-level parameters (and syntax) for the model type you wish to use, refer to the relevant section of the *Simulation Models and Analyses Reference*.

Multiple parameters must be separated by the pipe character (|).

You may remember that a component-level simulation parameter can also be set as a component parameter – appearing in the **Parameters** region of the associated *Component Properties* dialog, with the ability to then be displayed on the schematic sheet. By default, a parameter entry in the **Sim Parameters** field will be automatically added as a component parameter. If you do not want a simulation parameter to be added as a component parameter, simply add an exclamation mark prefix to the parameter name (e.g. `!Initial Voltage=100mV`).

Consider our diode model, which has the following four component-level parameters:

- Area Factor
- Starting Condition
- Initial Voltage
- Temperature.

Now consider adding values in the database for the Area Factor (say 2) and Temperature (say `22°C`). Also, both of these should not be added as component parameters. The entry in the **Sim Parameters** field would be:

`!Area Factor=2|!Temperature=22`

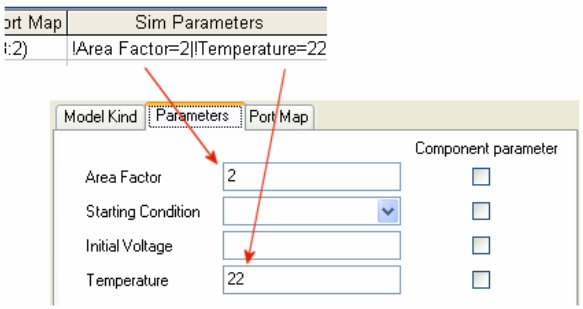


Figure 18. Specifying values for associated model parameters (component-level).

Checking the Link

Once you have placed the component from the Database Library, it is not a bad idea to check the simulation link, and to verify that the information defined for the link is indeed as required. Simply double-click on the placed component to access its associated *Component Properties* dialog. In the **Models** region of the dialog, simply double-click on the simulation model entry to access the *Sim Model* dialog, from where you can check that:

- Any linked model file has been located as expected. When found, the **Model File** tab of the dialog will display the content of the file.
- The remaining simulation information from the database has been added to the dialog as expected.

Figure 19 illustrates the information added to the *Sim Model* dialog for the JAS33 diode example, upon placement of the component on the schematic sheet.

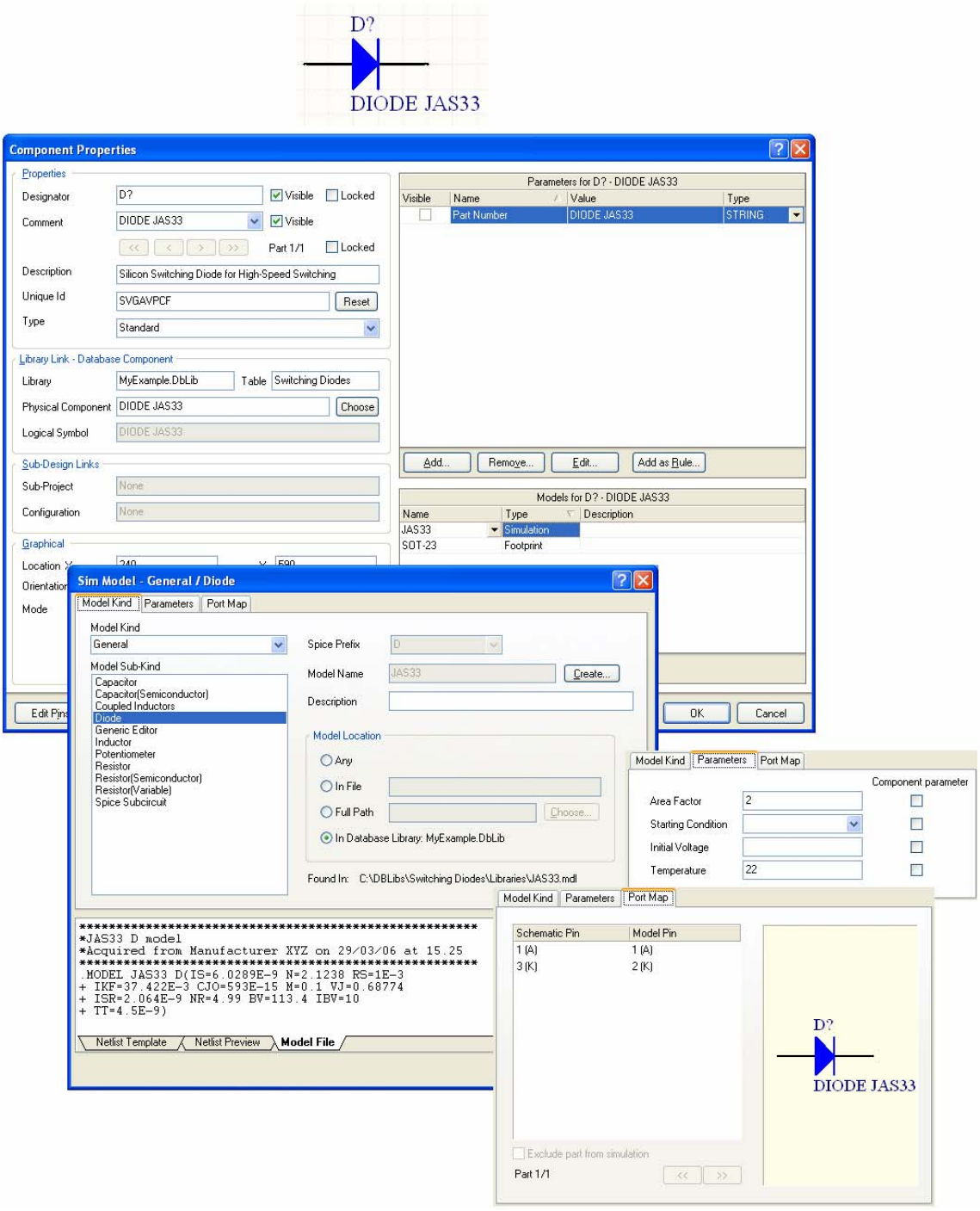


Figure 19. Sim Model dialog entries for the JAS33 diode example.

Maintaining the Link

After placement, the chosen key parameter in the DBLib file is used to ensure that the placed component on the schematic retains its link to the corresponding record for that component in the external database. This means that at any stage in the future, changes to parameter and model information in the database can be easily passed back to the placed component, synchronizing the two.

Whereas component design parameters can be updated using either the **Update Parameters From Database** or **Update From Libraries** commands – both available from the Schematic Editor's main **Tools** menu – update of simulation link information must be carried out using the latter.

Although simulation parameters can be added as component parameters, they are not recognized as design parameters for the purpose of updating.

The update process considers the information for the link only – i.e. the fields stored in the external database. When the model link involves an associated model file (`*.mdl`, `*.ckt`), any changes (e.g. `.MODEL` or `.SUBCKT` definitions, parameter values, expressions, etc) required must be made within the file. These changes will be 'seen' by a placed component directly, and can be checked from the **Model File** tab of the *Sim Model* dialog.

Revision History

Date	Version No.	Revision
06-Apr-2006	1.0	Initial Document Release.
19-Mar-2008	1.1	Updated page size to A4.

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